

Exhibit C

TechEd

Europe 2014

Big Compute in the Cloud with High Performance Computing on Azure

DBI-B216

Mark Scurrall



What is Big Compute and HPC?

Example Scenarios:

Media transcoding

Rendering

Image analysis & processing

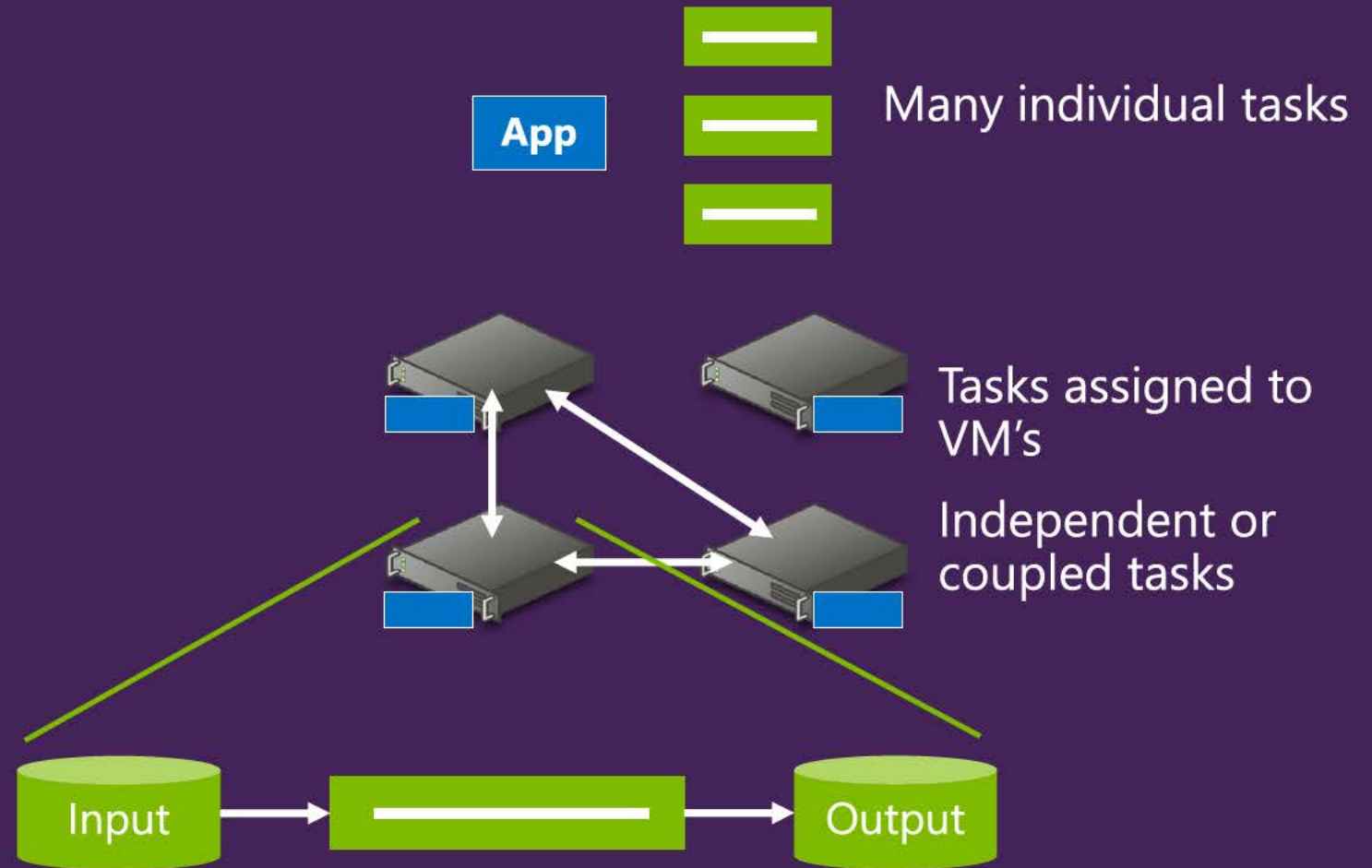
Builds

Test execution

Fluid dynamics

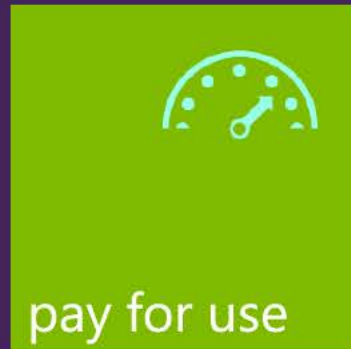
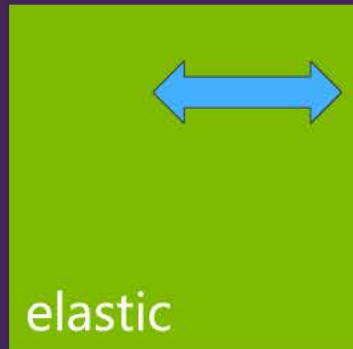
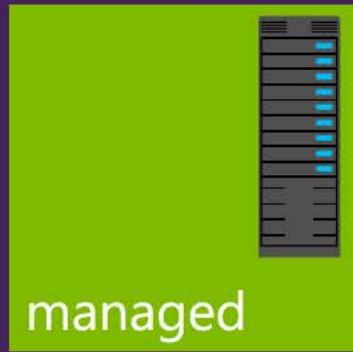
Monte Carlo simulations

Engineering stress analysis



Why Use Azure for Big Compute?

For existing scenarios:



New possibilities:

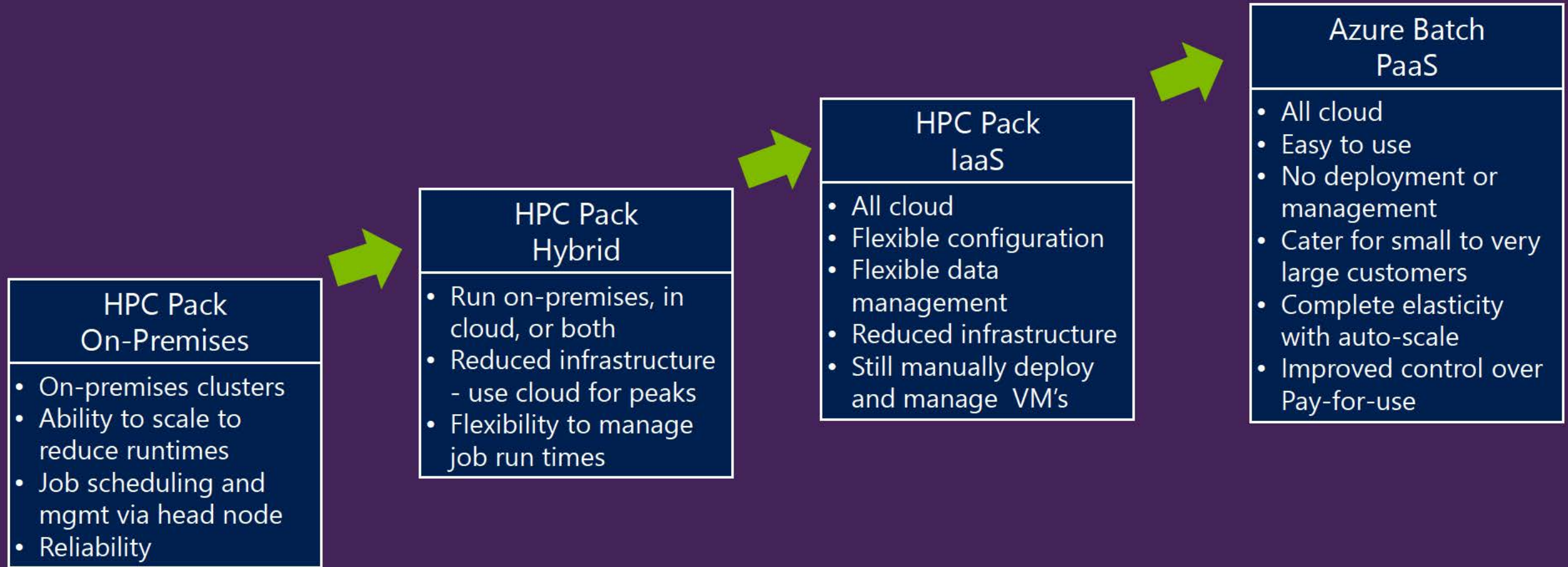


Business Use Case

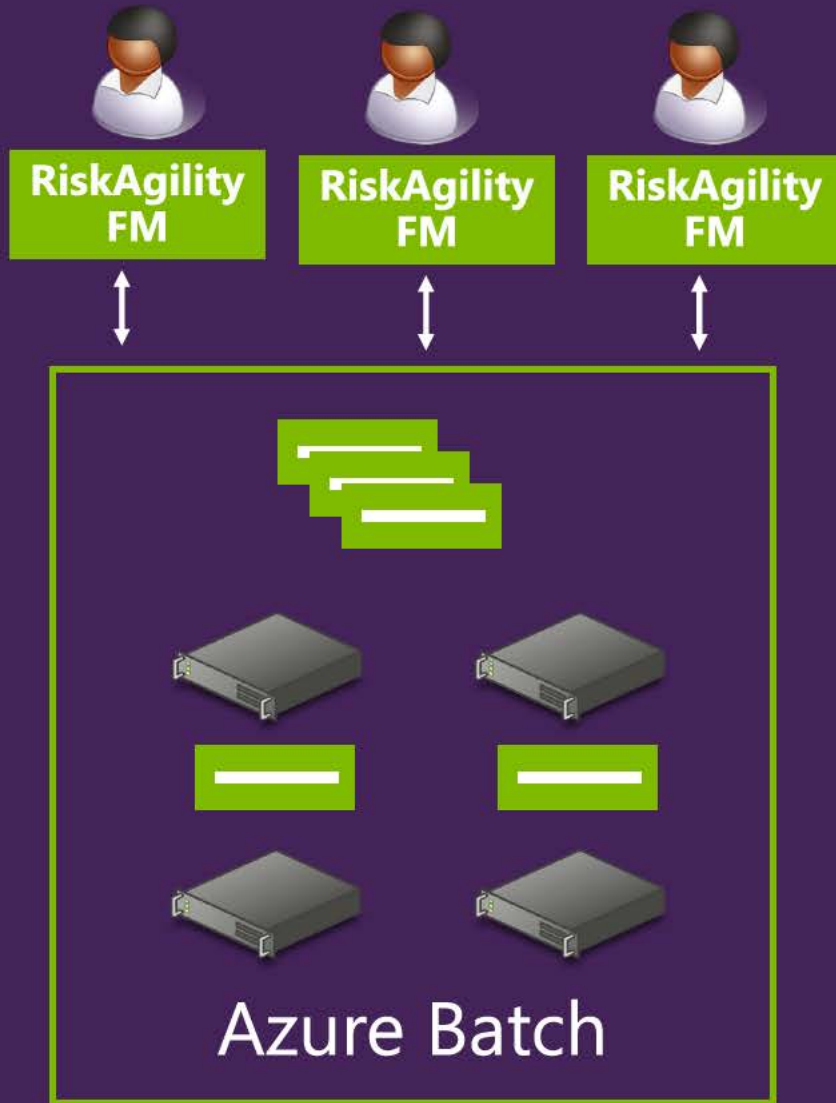
RiskAgility FM



Big Compute Evolution



RiskAgility FM



- RiskAgility FM :

- Designed for Actuaries to develop and run models to manage risk and safeguard solvency with a primary focus on the life insurance industry
- Projection system to model asset and liability cashflows over the term of policies

- Azure Batch Usage:

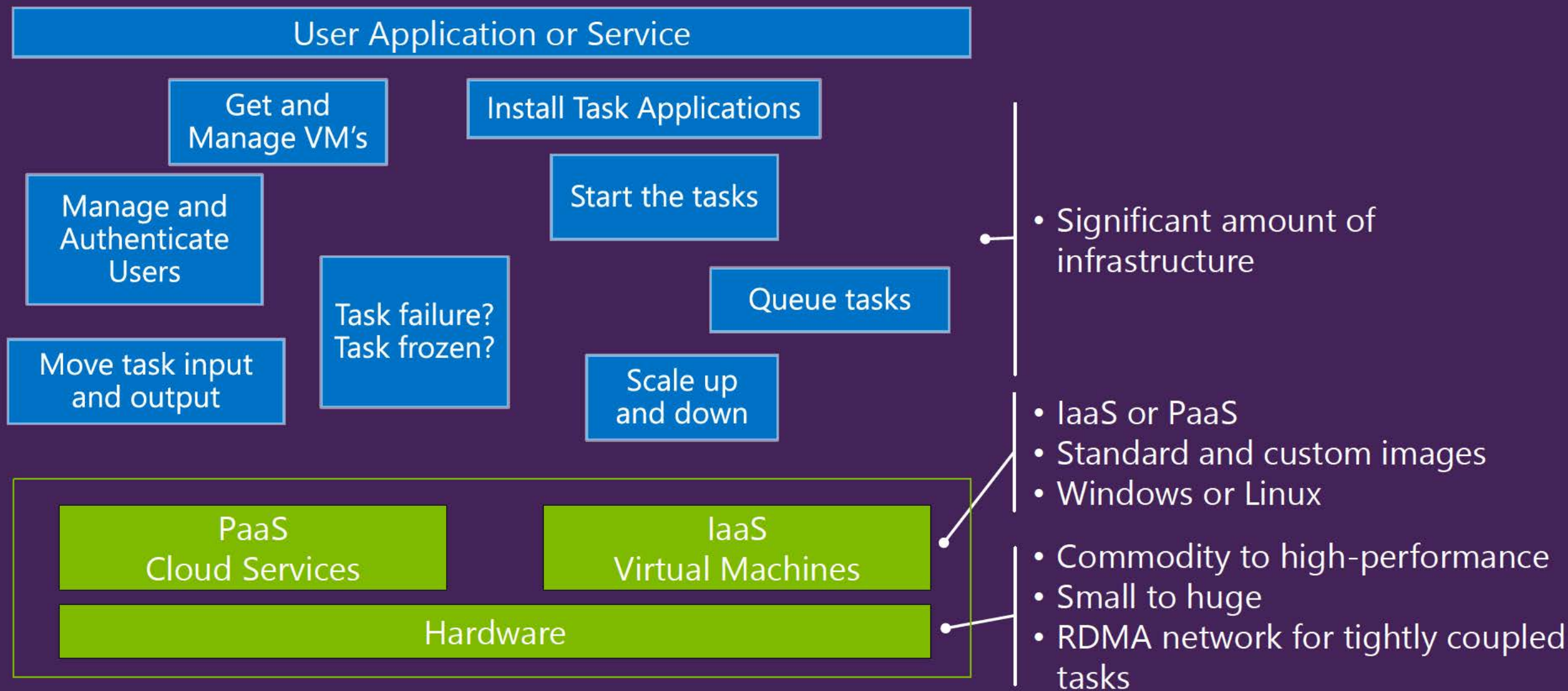
- Large scale deployments without infrastructure
- Auto-scale to meet demand (reduced costs and administration)
- Opens up grid computing to smaller clients
- Lightweight REST interface and wrapper API

Demo:

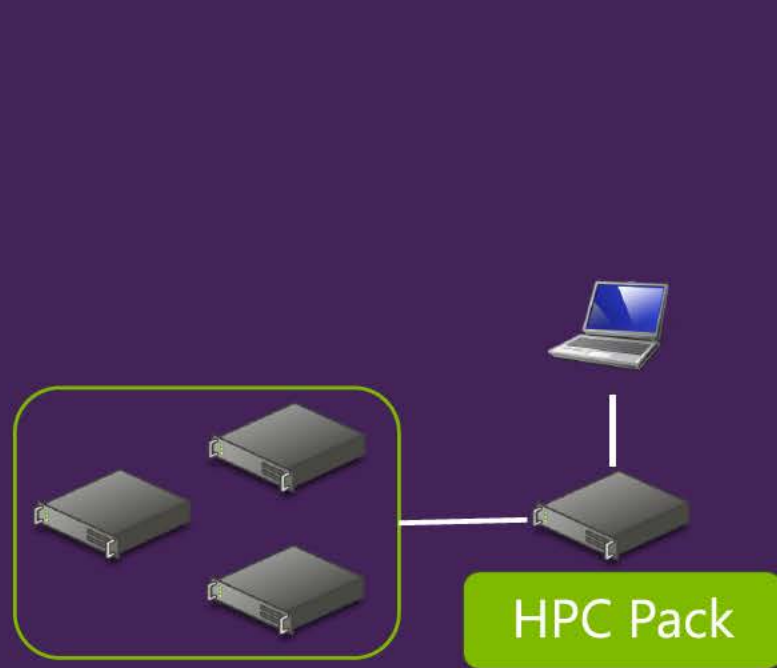
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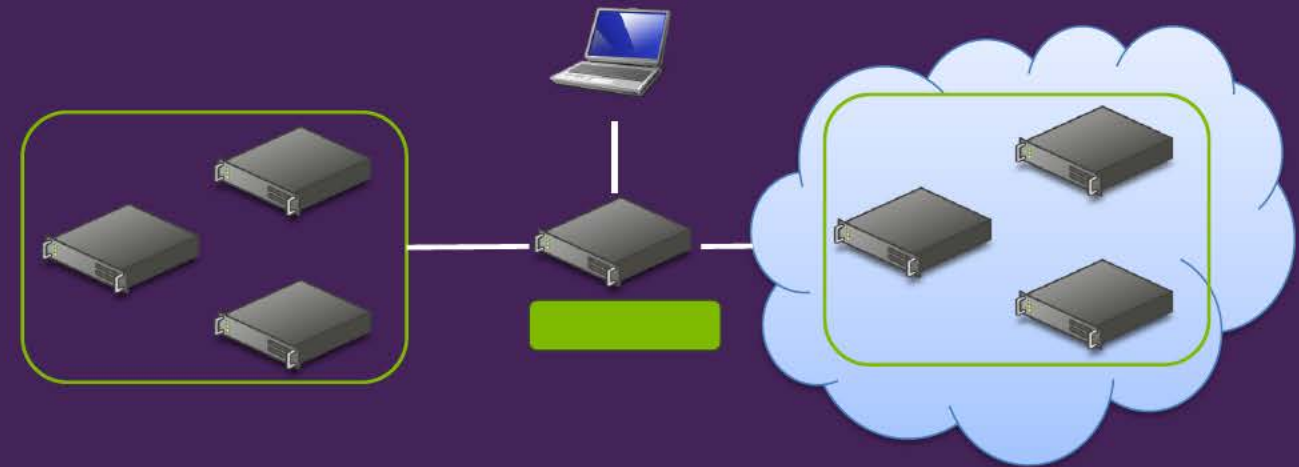
Azure Compute



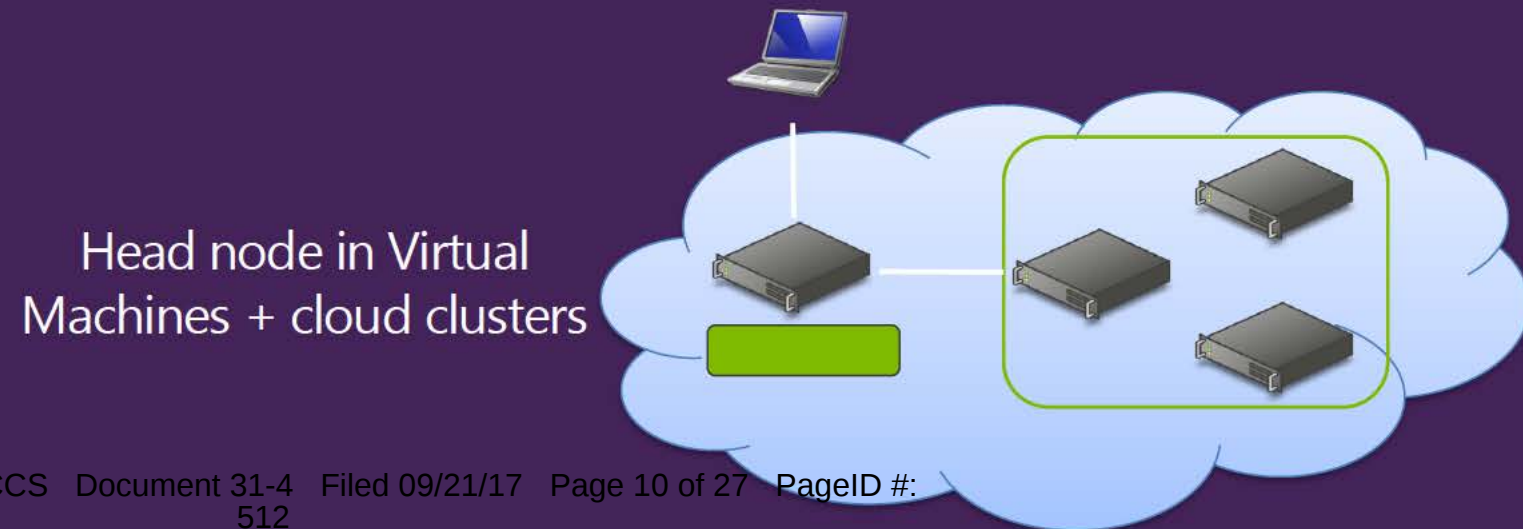
HPC Pack: On-Premises and Hybrid Big Compute



On-premises head node and clusters

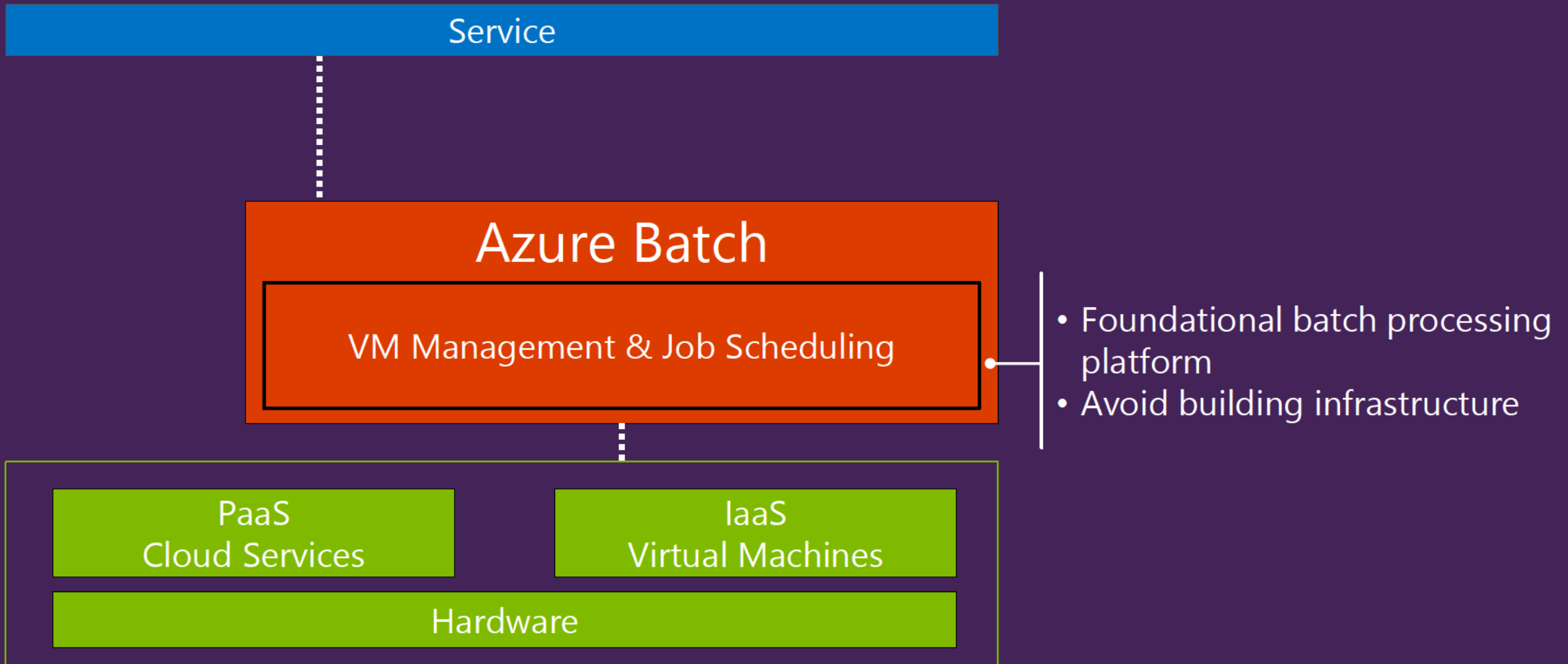


On-premises head node and clusters + cloud clusters



Head node in Virtual
Machines + cloud clusters

Azure Batch - Add Big Compute to a service



Azure Batch

Caller:

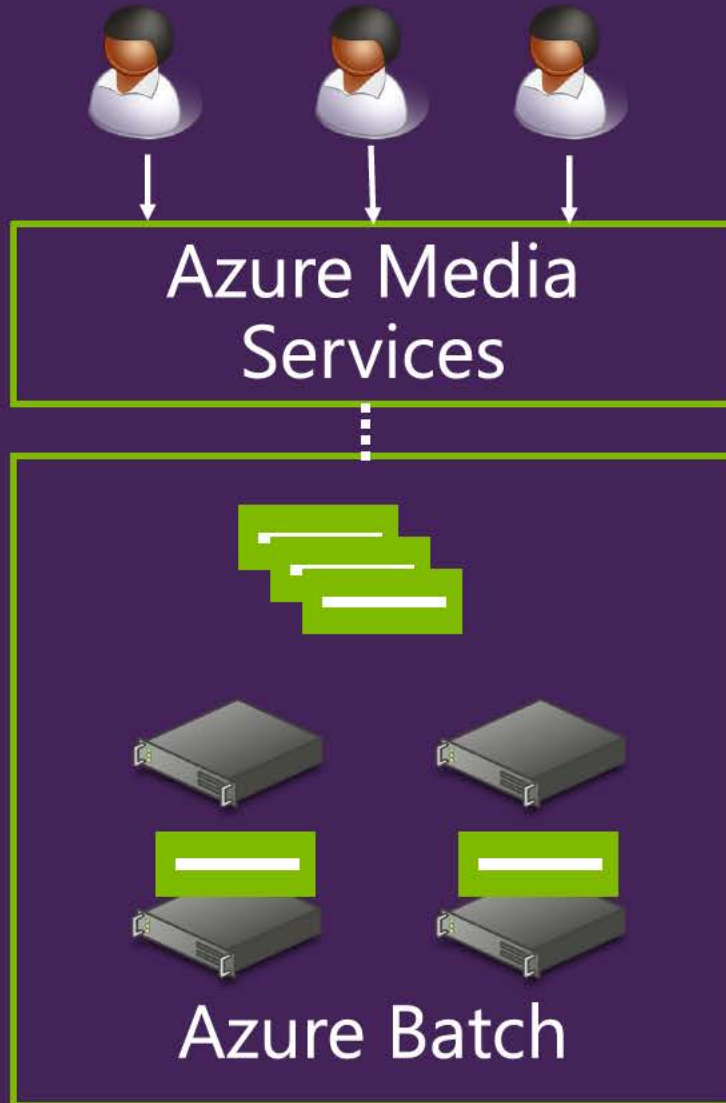
- Specify and configure the VM's
- Supply the task applications and files
- Provide the command lines
- Optionally specifies a schedule for recurring work

Service provides:

- Get and manage the VM's
- Copy files between Azure Storage and VM's
- Allocate and run tasks on available VM's
- Queue work until VM's are available
- Manual or automatic scale up and down
- Handle errors; e.g. re-queue on VM or application failure; kill frozen application
- Monitoring information

Demo: Building a service using Azure Batch

Use Case – Azure Media Services



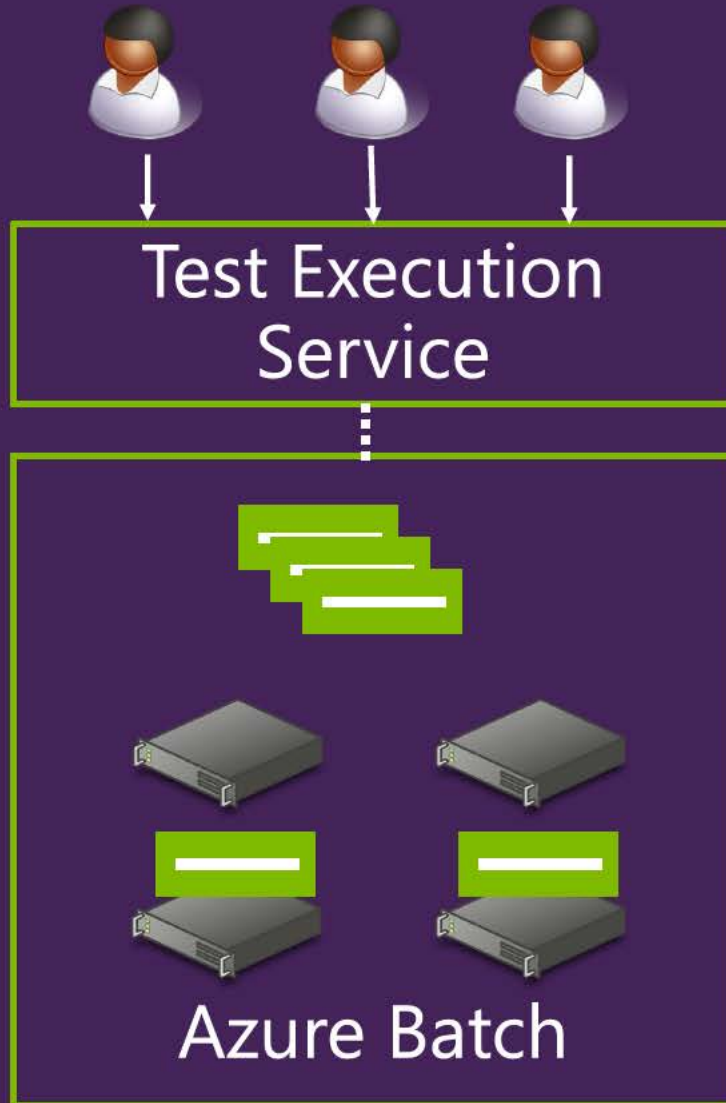
Azure Media Services:

- Media transcoding platform service
- Media-focused UI, API, pricing, SLA, etc.
- Uses Batch for all transcodes
- Supplies the transcoding applications
- Hides the VM's

Azure Batch Usage:

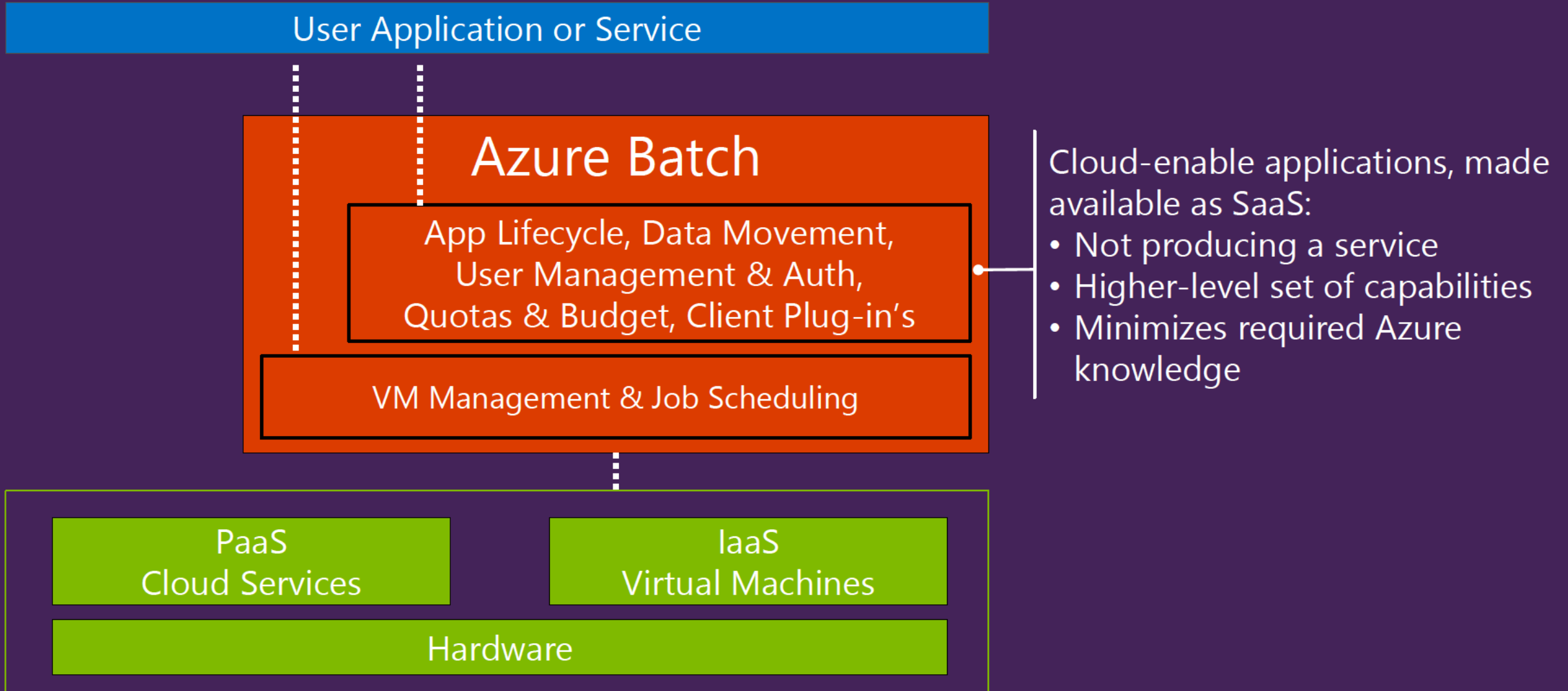
- Long-term pool of VM's with transcoding applications installed
- Pool scaled by Media Services according to load

Use Case – Software Test Service



- Test Execution Service:
 - Engineers submit test suites for execution
 - Used for many Azure services
- Azure Batch:
 - Pool of VM's created for each test suite
 - Test suite is completely custom application
 - Pool auto-scaled according to queue size
 - Spread across multiple regions with multiple Batch accounts

Azure Batch - Cloud-enable applications

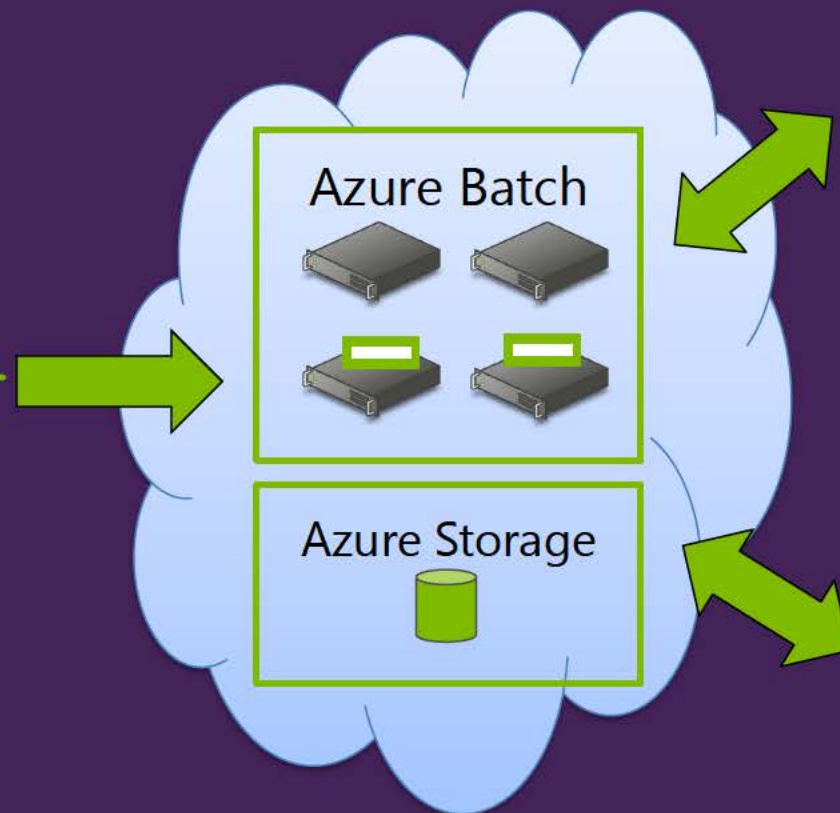


Overview

Developer

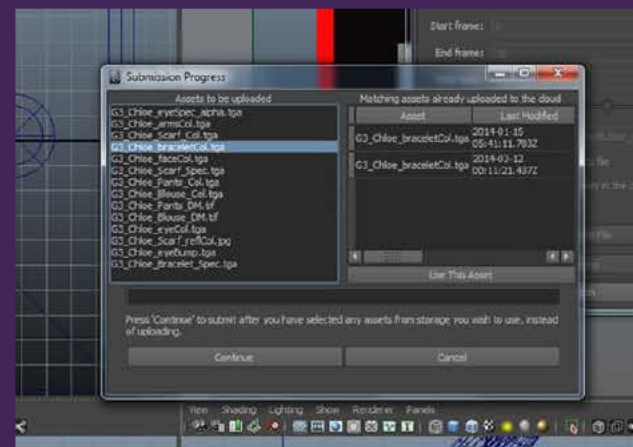


Use Batch SDK to cloud-enable & upload the app



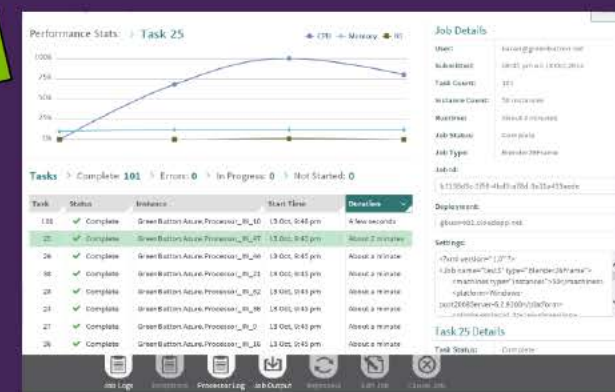
End-User

- Submit jobs via plug-in
- Sync data
- Monitor via plug-in and/or portal



Ops / Admin

- User & group mgmt.
- Permissions
- Job & VM monitoring
- Usage reporting
- Quota mgmt.
- Troubleshooting



Demo: Cloud-Enabling Applications with Azure Batch

Use Case – Animated Feature Film Rendering



- PROAN Entertainment – ‘Pepito – La Película’
 - 90 minute 3D animated feature film
 - Would have taken over 13 years to render using existing on-premises cluster
 - Rendered entirely in Azure using Blender in about 3 months

Related Azure Services

Batch

- Large-scale application execution - 1000's of VM's, millions of tasks
- Existing or new applications, no special API required
- Invoke via command line
- On-demand or recurring work

Scheduler

- Recurring invocation of services via HTTP or Storage Queues
- Services actually execute the work
- Standalone service and embedded in Websites and Mobile Services

WebJobs

- Small-scale execution of work within context of web site
- WebJobs SDK simplifies app development
- Now GA!

Mobile Services Scheduled Job

- Small-scale execution of work within context of Mobile Services

HDInsight

- Managed Hadoop as a Service for processing Big Data
- Built on the Hadoop ecosystem: Hive Hbase, Storm, Mahout and more
- Leverages Azure Storage for data storage

Automation

- Scheduled execution of runbooks to automate end to end processes across Azure and 3rd party services
- Built on PowerShell Workflow so you can write your own PowerShell modules or use existing modules

Worker Roles Virtual Machines

- Full control, but most work

Summary

Azure makes HPC and large-scale compute more broadly accessible, radically easier, and more cost-effective

Comprehensive set of capabilities:

- Enterprise ready infrastructure

- Choice of VM's - commodity to high-performance

- IaaS and PaaS, Windows and Linux

- On-premises, hybrid, and cloud-only

- Azure Batch Preview now available providing job scheduling as-a-service!

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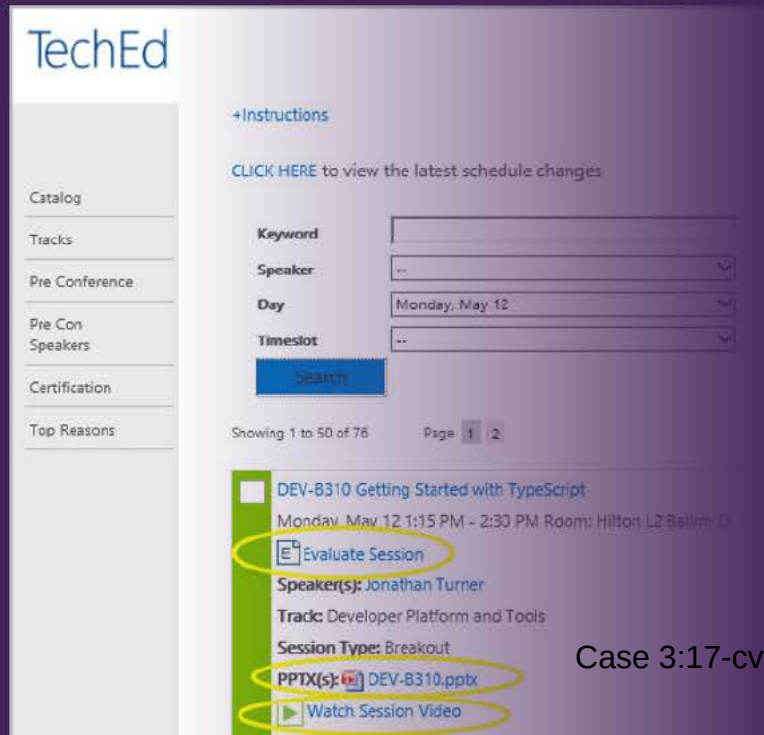
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